How to configure an Anybus EtherNet/IP Scanner module with RSNetWorx for EtherNet/IP

More info about the network and products

This document gives a brief description of how to configure an Anybus Scanner product for EtherNet/IP. For further information about the products, please consult the HMS homepage, www.anybus.com. The latest manuals, EDS-files etcetera can be downloaded from that location.

For more information concerning the EtherNet/IP network the Open EtherNet/IP Vendor Organization has a homepage. Please visit, www.odva.org, for more information about EtherNet/IP.

Document history

Revision	Date	Description	Responsible
1.00	2007-10-17	Created	Thorbjörn Palm
1.01	2007-12-14	Minor revision	Thorbjörn Palm
1.02	2008-01-10	Minor correction	Thorbjörn Palm

Contents

1. Solution overview

This application note describes how to configure an Anybus EtherNet/IP Scanner module and how to set up the EtherNet/IP network using RSNetWorx. Below you can find an overview of the system described in this document. Other nodes may be attached to the network, but are not necessary.

The configuration is described in two steps.

1. At first the Anybus Scanner module configuration is explained.

2. Secondly the configuration of the EtherNet/IP network is described.

Note: This document is valid for all Anybus EtherNet/IP Scanner products, however sections written in *italics* describe the configuration of a specific product.

The contents describe step by step how a configuration is done. This document assumes the reader is familiar with industrial communication, EtherNet/IP networks and HMS PCI-card and X-gateway.
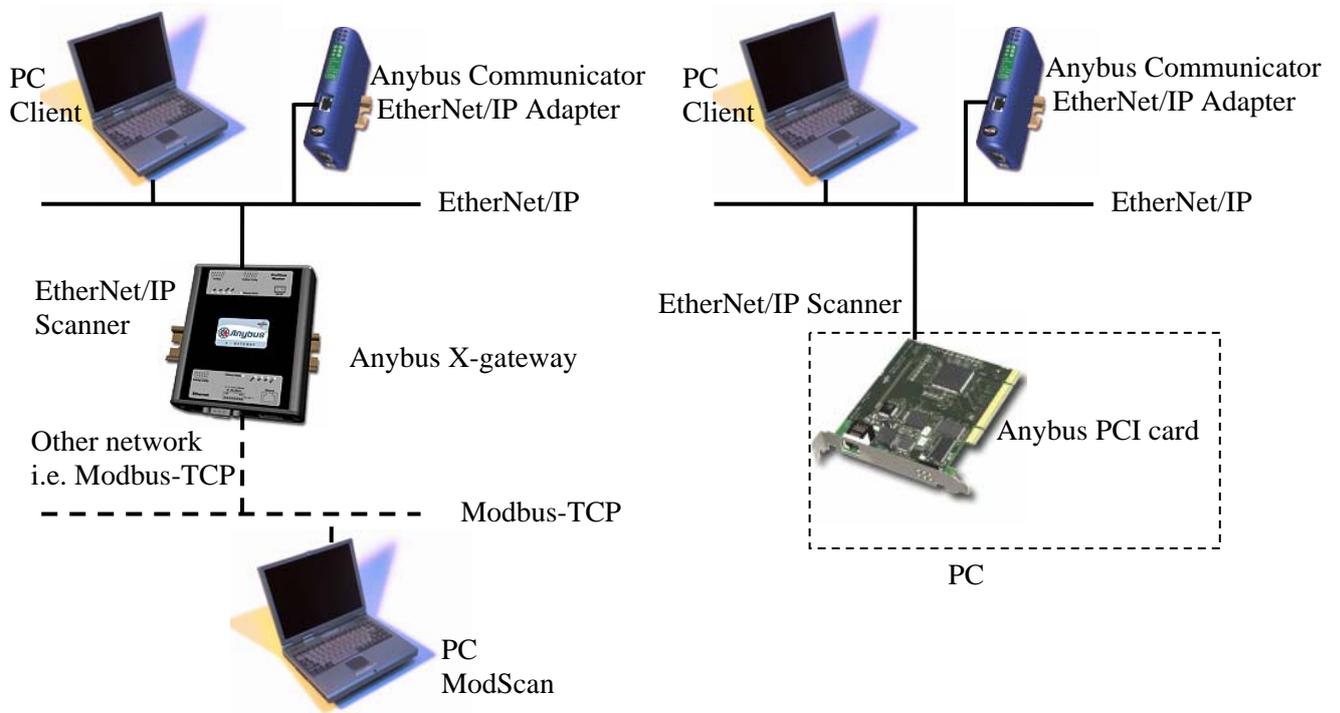
Figure 1 Hardware connection overview.

2. Applicable Anybus products

The following table specifies the relevant Anybus products for this document.

Description	Name / Type
Anybus X-gateway Scanner	EtherNet/IP
Anybus PCI Scanner	EtherNet/IP
Anybus-M Scanner	EtherNet/IP

3. Requirements

The following equipment is needed to setup a successful configuration. Note that RSNetWorx for EtherNet/IP is licensed Rockwell Automation software.

Description	Name / Type	Version
Microsoft Windows terminal software	HyperTerminal	5.1
X-gateway Interface Addendum	Anybus X-gateway EtherNet/IP Scanner Interface Addendum	1.00
X-gateway User Manual	X-gateway User Manual	1.11
Anybus-M Fieldbus Appendix	Fieldbus Appendix Anybus-M EtherNet/IP	1.02
EtherNet/IP network configuration software	RSNetWorx for EtherNet/IP	8.00.00 (CPR 7)
EtherNet/IP driver configuration software	RSLinx Classic Lite	2.51.00.21 (CPR 7)
Ethernet monitoring software (Optional software for monitoring)	Wireshark	0.99.6a
Power supply 24VDC	n.a.	n.a
Configuration cables	n.a.	n.a.

4.   Anybus configuration

The first step is to configure the Anybus Scanner module. The configuration of the IP-settings is described in the following chapter. In the two following chapters the configuration of the Anybus-M, Anybus PCI-card and X-gateway are explained.

4.1.   IP settings

Make sure each node on the network has a unique IP address. The IP settings of the Anybus EtherNet/IP modules can be configured in various ways. In many industrial applications DHCP with a fixed MACID table is used. For the Anybus Ethernet modules DHCP is activated by default.

In other cases it is recommended to use the Anybus IPconfig tool for configuring the IP-settings. The Anybus IPconfig tool can be used to configure the IP settings of all Anybus EtherNet/IP modules. The program can be downloaded at HMS website[1]. Start the program and the main window will be opened.
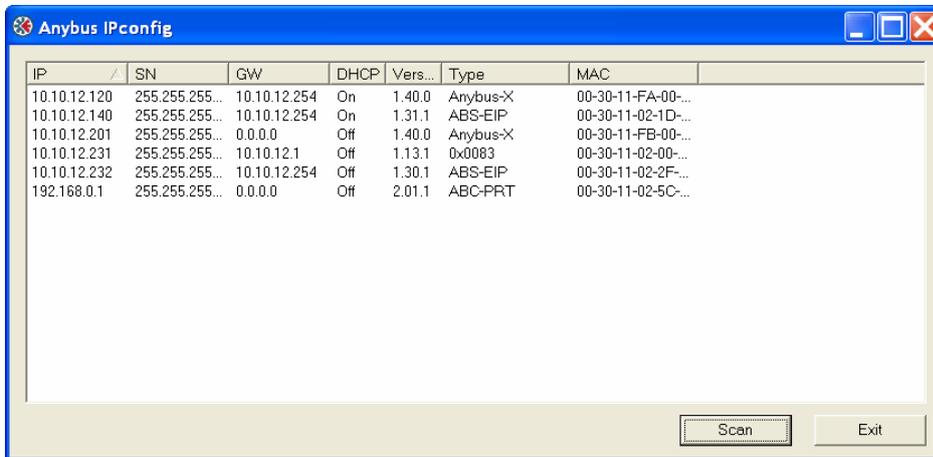

Figure 2   The Anybus IPconfig tool.

The program scans the network for Anybus Ethernet modules. The settings can be configured manually or the DHCP function can be used. To change the settings manually, double click on the module of interest and enter the desired IP-settings.
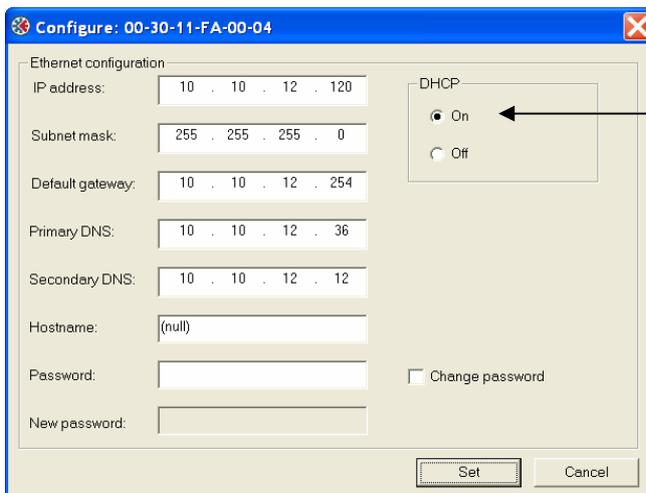

Using DHCP disables the manual IP-settings In this case make sure the DIP-switches are set in zero position.

Figure 3   Configuring the IP settings.

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[1] www.anybus.com

As mentioned before there are other ways to configure the IP settings. The IP settings can also be configured by gleaning or using the web interface in the module. See the notes below for additional product specific information.

Note for the Anybus-M Scanner:
DIP switches 1-8 set the last part of the IP address, 192.168.0.xxx. The switches will be found next to the indication LEDs. The modules can also be configured by mailbox commands or by the ethcfg.cfg configuration file.

Note for the X-gateway:
The X-gateway can also be configured by the DIP switches as described above or by the ethcfg.cfg configuration file.

Note for the Anybus PCI card:
The PCI-card can also be configured by mailbox commands or by the ethcfg.cfg configuration file.

For further instructions see the respective manual or appendix.

4.2.   Anybus-M and Anybus PCI-card configuration

The Anybus-M and the Anybus PCI card are configured via the host application interface using the mailbox interface. Refer to the Anybus-M Fieldbus Appendix and the Anybus API reference manual for details.

4.3. Anybus X-gateway configuration

Use the HyperTerminal on a PC to configure the X-gateway. Connect a serial cable between the PC and the config port on the X-gateway. Start the HyperTerminal and open the "File" menu and click on new, choose the desired COM port and then click on OK. The following window will appear.
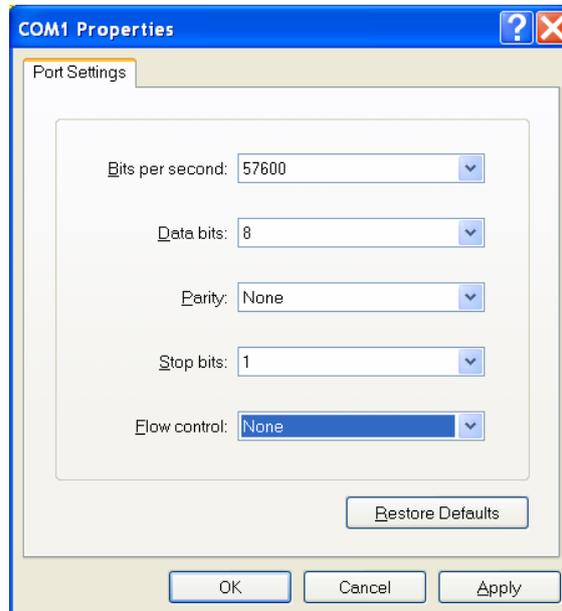

Figure 4   Configuring the connection in the HyperTerminal.

Make sure the settings are identical to those shown in the window above. Alternatively download a HyperTerminal session file from the HMS website[2], double click on it and select COM port.

Connect and press ESC and the following menu will appear.
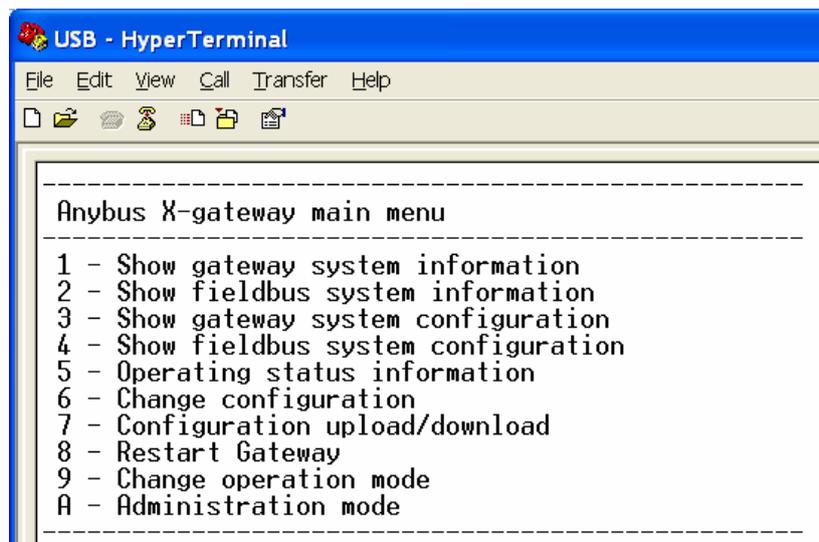
Figure 5   Anybus X-gateway Main menu.

Press 6 and enter the desired configuration.

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[2] www.anybus.com

The figure below shows an example; in this case an EtherNet/IP Scanner to EtherNet/IP Adapter X-gateway is used and 20 bytes of I/O data is configured.
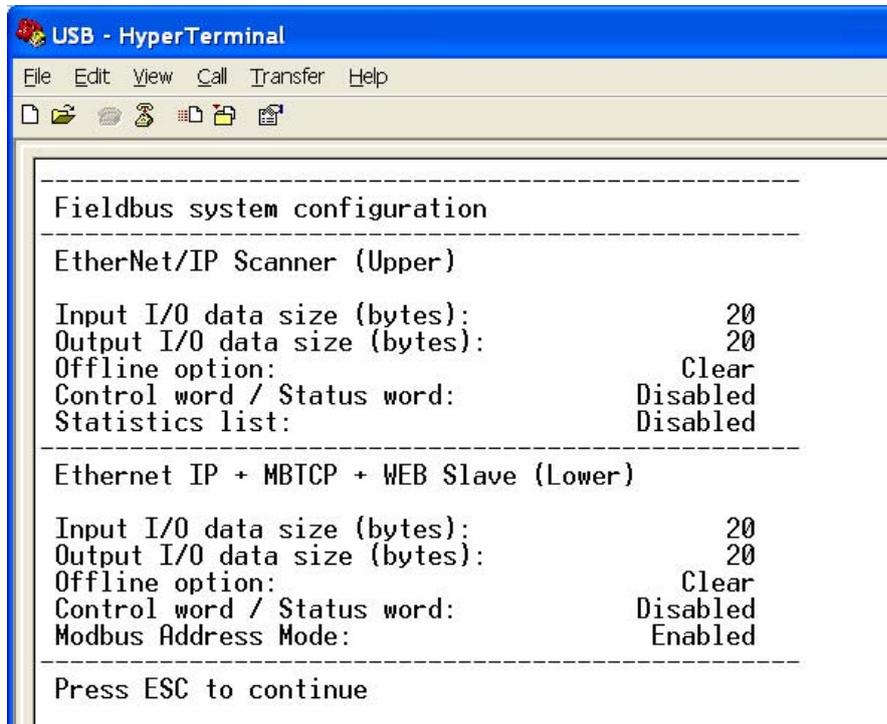

Figure 6   The X-gateway configuration.

5. EtherNet/IP configuration

To configure the EtherNet/IP network the tools RSNetWorx for EtherNet/IP and RSLinx are used. Firstly the Ethernet Driver needs to be configured in RSLinx and secondly the EtherNet/IP network is configured by RSNetWorx.

5.1. Configuring the Ethernet driver

Start the RSLinx software from Rockwell. Open the Communications menu and select Configure Drivers.
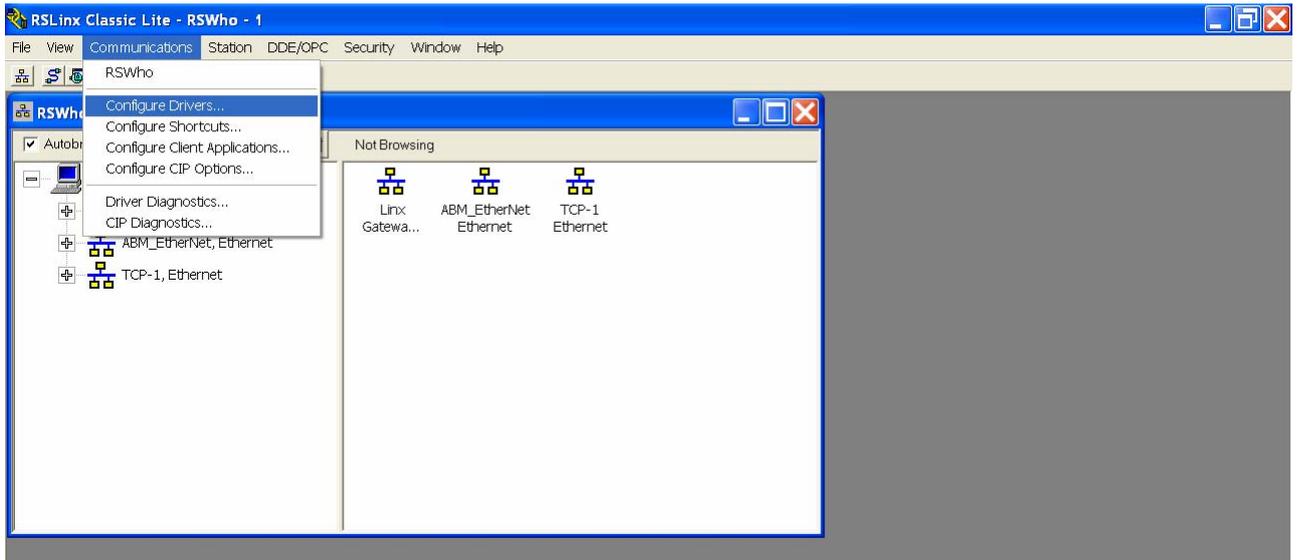
Figure 7   Opening the Configure Drivers menu.

In the following window select Ethernet/IP Driver and then click on Add New❶.
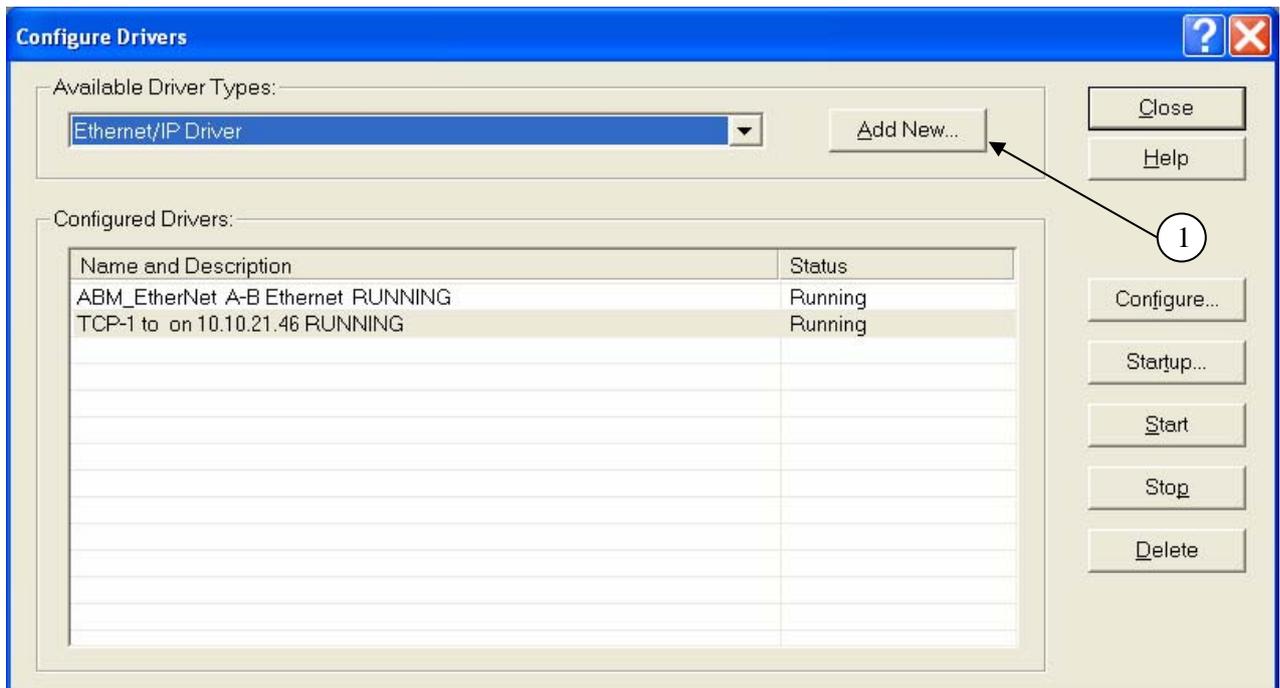
Figure 8   Adding a new Ethernet device.

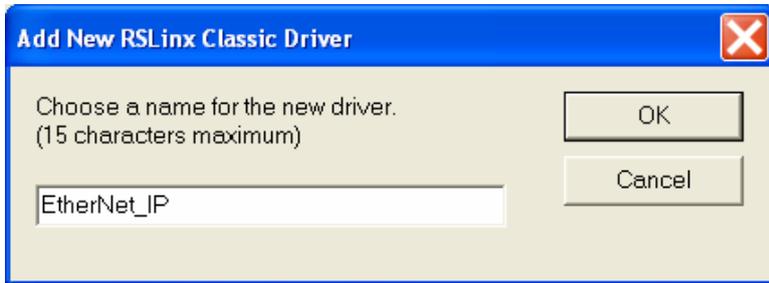Select a name for the driver and press OK.

Figure 9   Naming the new Ethernet device.

In the next dialogue window the EtherNet/IP settings are configured. In this case the local subnet is browsed. If it is desired a remote subnet can be browsed. The subnet chosen is the subnet your EtherNet/IP devices are connected to.
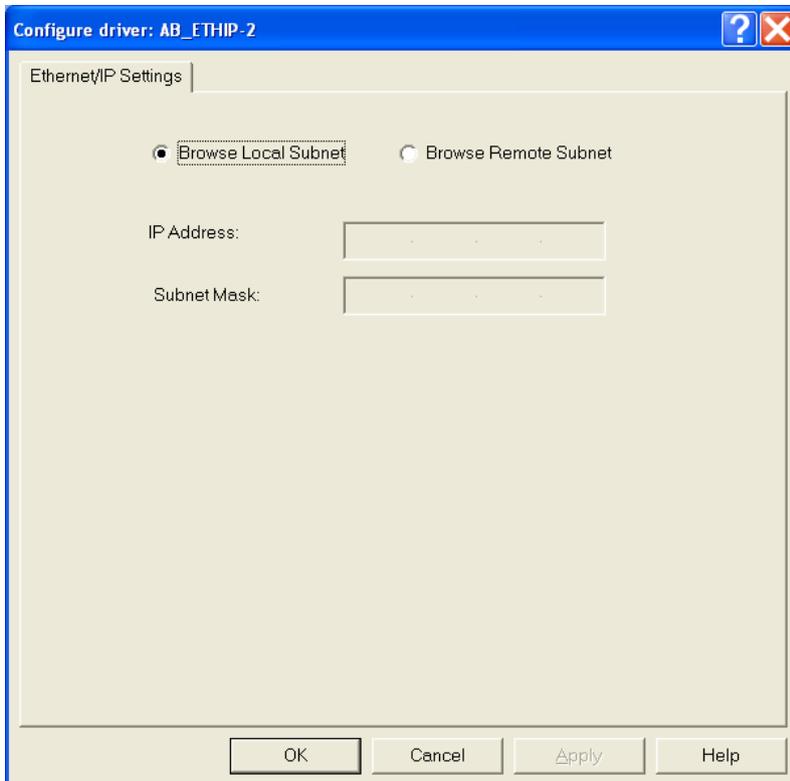

Figure 10 Configuring the driver settings.

5.2. EtherNet/IP network configuration

To configure the EtherNet/IP network, start RSNetWorx for EtherNet/IP and follow the steps below.

1. Setting the Scanner in idle mode

First of all, to be able to download the Scanlist the operation mode of the Scanner has to be idle mode. If the Scanner is in run mode, the operation mode has to be hanged to idle mode. Otherwise proceed to step 2. Installing the EDS-file.

The procedure for changing operational mode is depending on what kind of products is used. See the notes below depending of what product is of interest.

Note for the X-gateway:

For the X-gateway the operation mode has to be changed from the gateway configuration interface. This can be done by connecting with the HyperTerminal and select the menu option 8, Change operational mode. For further instructions on how to connect to the X-gateway terminal interface, please see chapter 4.3, Anybus X-gateway configuration.
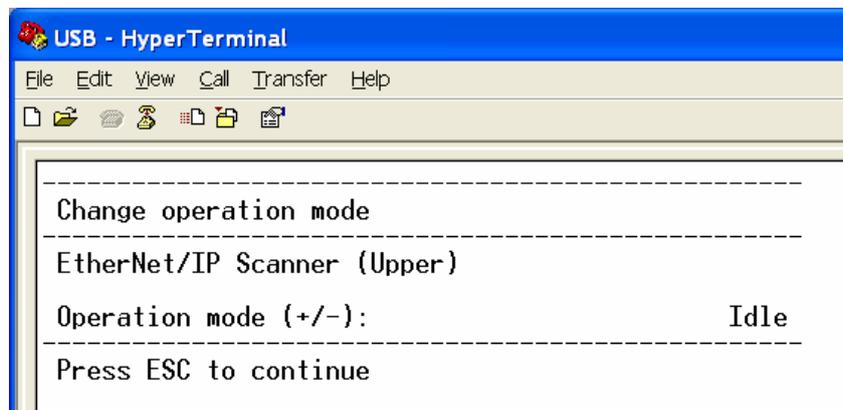

Figure 11 Changing the operation mode of the X-gateway .

Note for the Anybus PCI-card and the Anybus-M module:

The operation mode is changed using the web interface or by setting the attribute Scanner mode. The operation mode is also changed by sending a mailbox command from the application. For more details please see the Anybus-M EtherNet/IP fieldbus Appendix.

2. Installing the EDS-file

The first step is to make sure the correct the EDS-file has been installed in RSNetWorx. Open the Tools menu and select the EDS wizard.

Click on next in the first window and then select Register an EDS file as seen below.
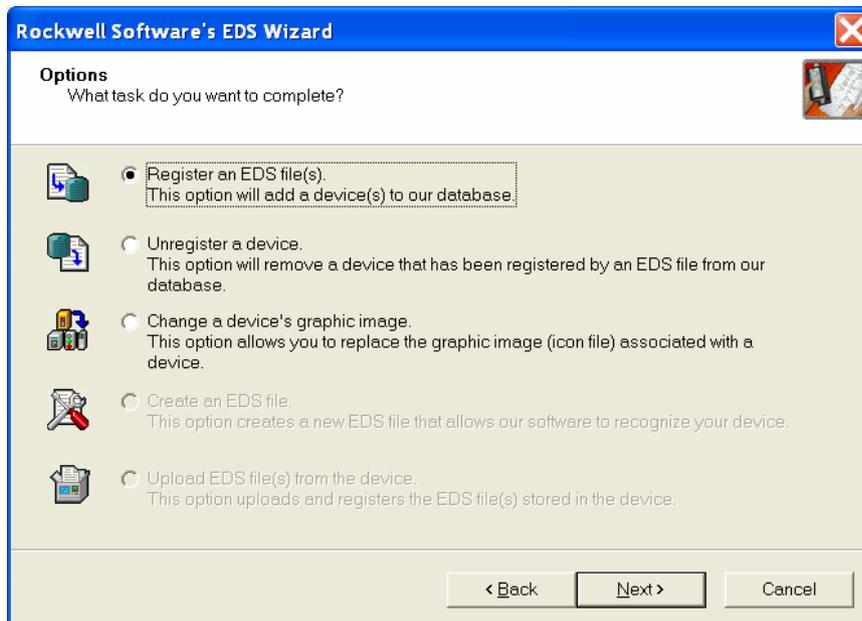

Figure 12 Registering the EDS file.

Follow the steps and browse to the location of the EDS file(s) and follow the instructions.

3. Selecting the Ethernet interface

When the correct EDS-file has been installed the Ethernet interface in the PC is to be selected. Open the Network menu and select Properties.
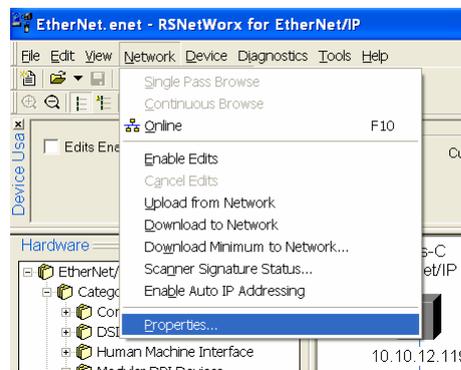

Figure 13 Opening the Network properties dialogue.
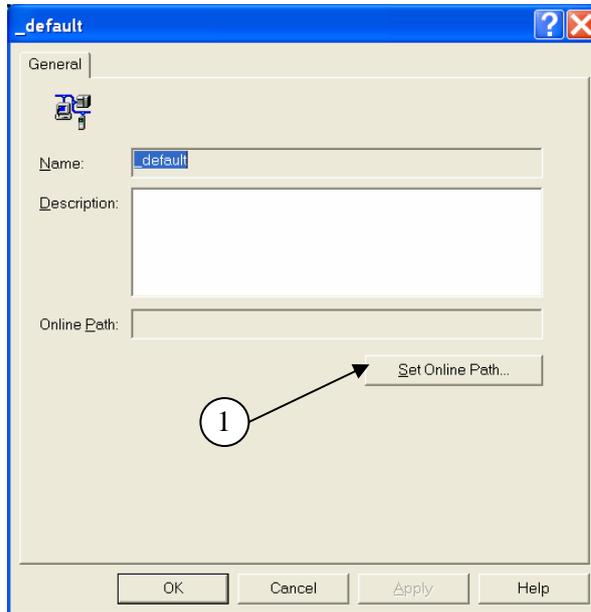
Then click on Set Online Path❶ as shown below.

Figure 14 Viewing the network properties.

Choose the Online path you wish to use and press OK.
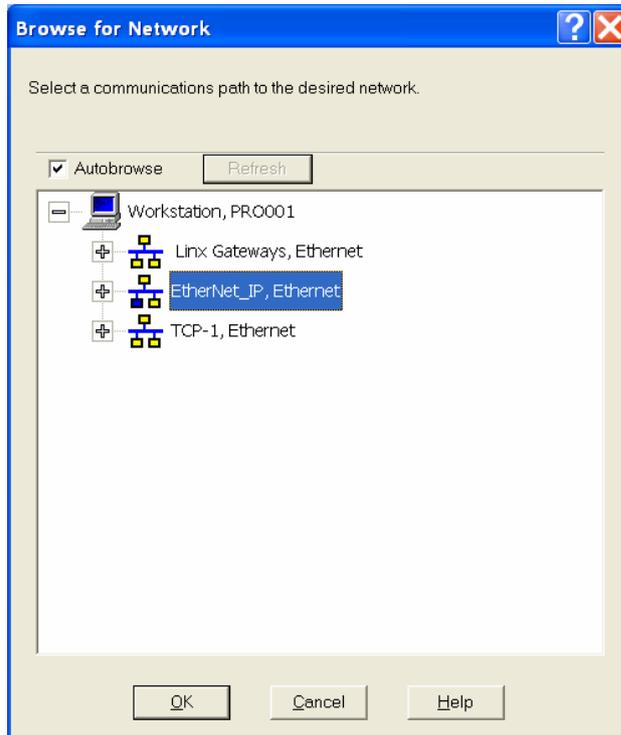

Figure 15 Browsing the available network.

4. Browsing the EtherNet/IP network

The network now can be scanned for devices. Begin with setting the program in "Online mode❶. The program will now scan the network and find the nodes connected to the network. In this test network, an Anybus X-gateway with a Scanner module and an Anybus Communicator has been set up.
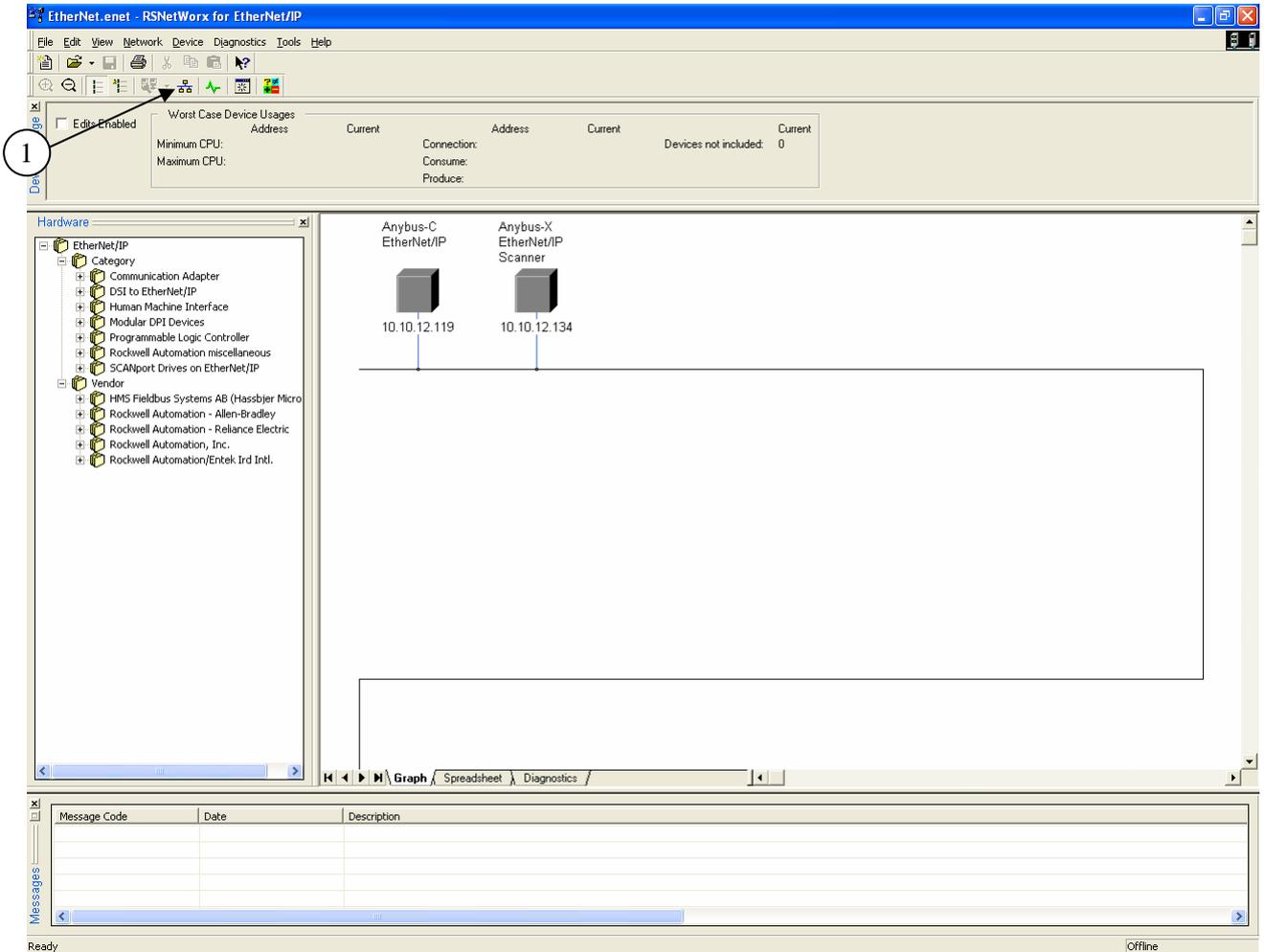

Figure 16 Scanning the network in Online mode.

5. Configuring the Scanlist

Now right click on the Scanner module and select Scanlist Configuration as seen below.
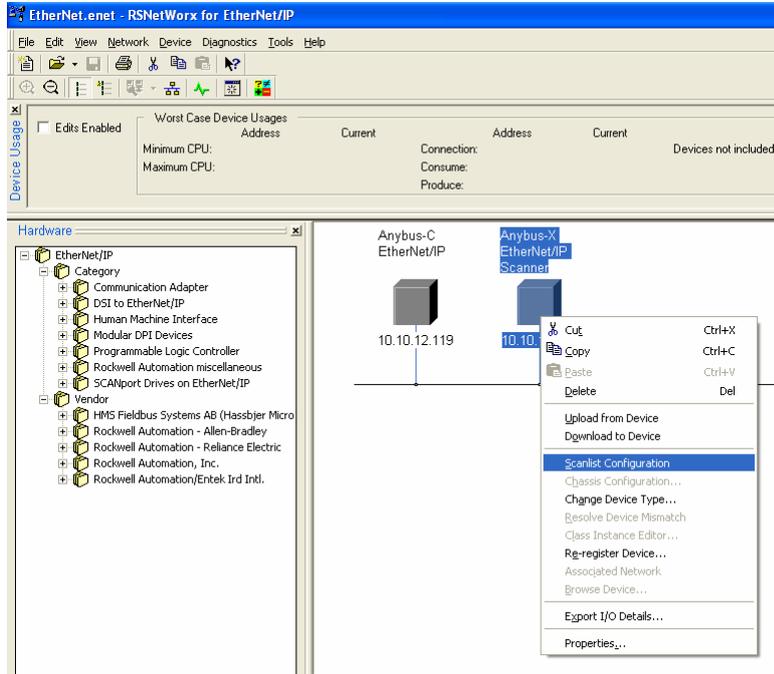

Figure 17 Opening the Scanlist Configuration.

The Scanlist Configuration Tool will now appear as indicated below. In this case an Anybus Communicator is used as an adapter module on the EtherNet/IP network. The Scanlist configuration will look different depending on how the EtherNet/IP network looks. In other words it depends on what Adapters there are in the network.
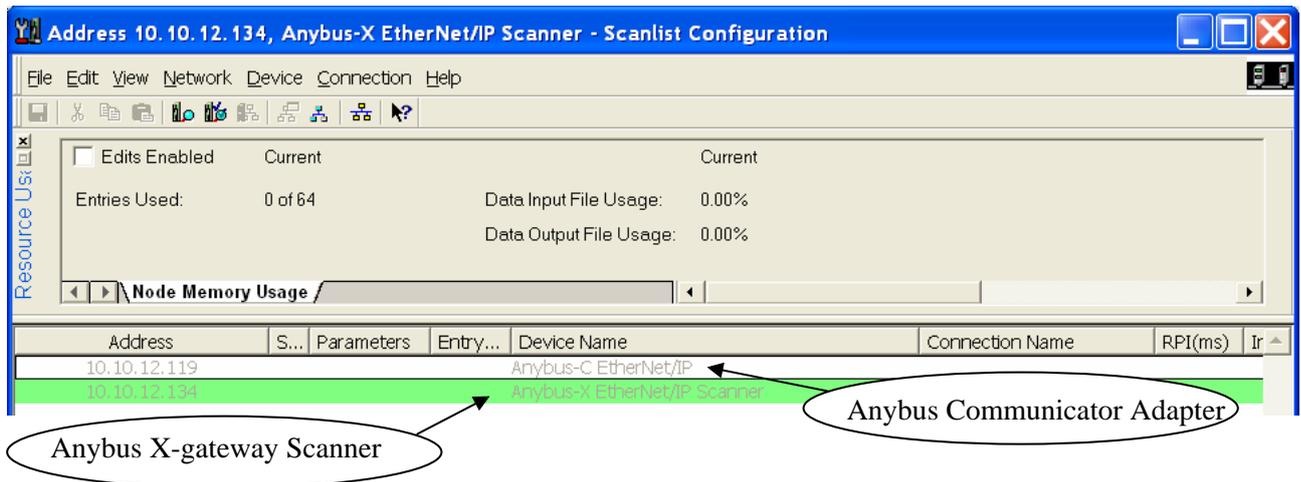

Figure 18 Viewing the Scanlist Configuration.

Double click on the Anybus Communicator to configure the I/O sizes for the Adapter module.

In the next dialogue window it is possible to configure the I/O sizes❶ and the Address offset❷. The Address offset indicates the offset in the memory of the Scanner. It is also possible to adjust the Requested Packet Interval❸. The RPI sets the update time on the EtherNet/IP network.
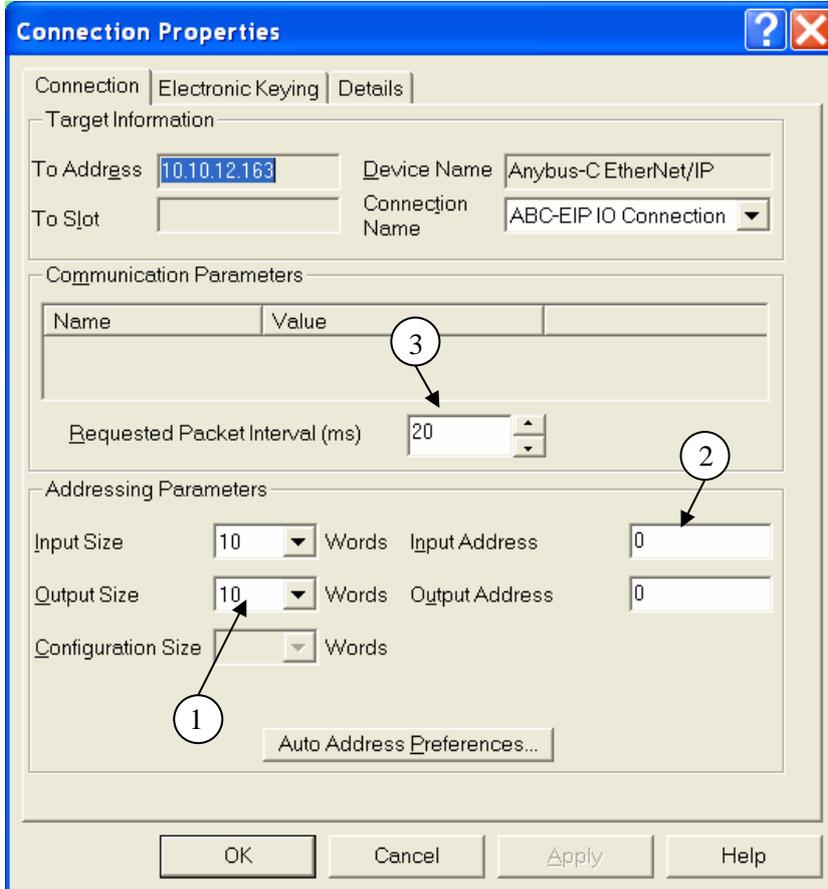

Figure 19 Configuring the scanning properties.

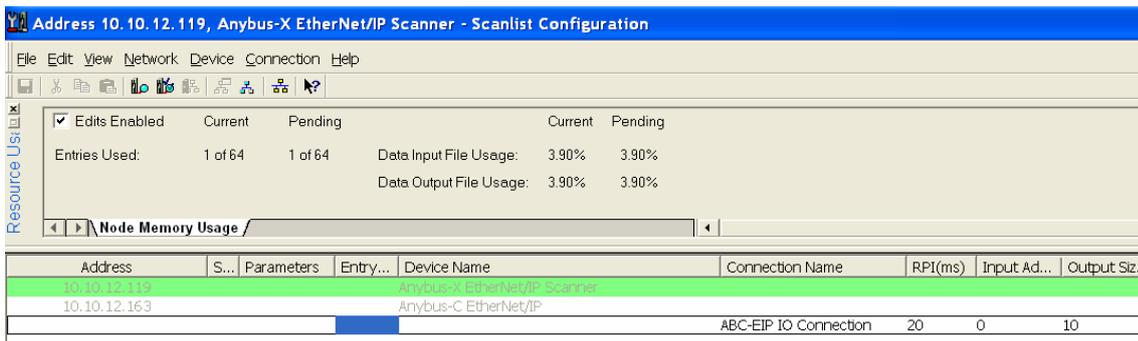Then press OK. The configured I/O sizes can now be seen in the Scanlist Configuration as seen below.

Figure 20 The Scanlist configuration when the I/O sizes are set.

6. Downloading the Scanlist

The Next step is to download the Scanlist to the Scanner. Right click on the Scanner module and select Download to Device as seen below.
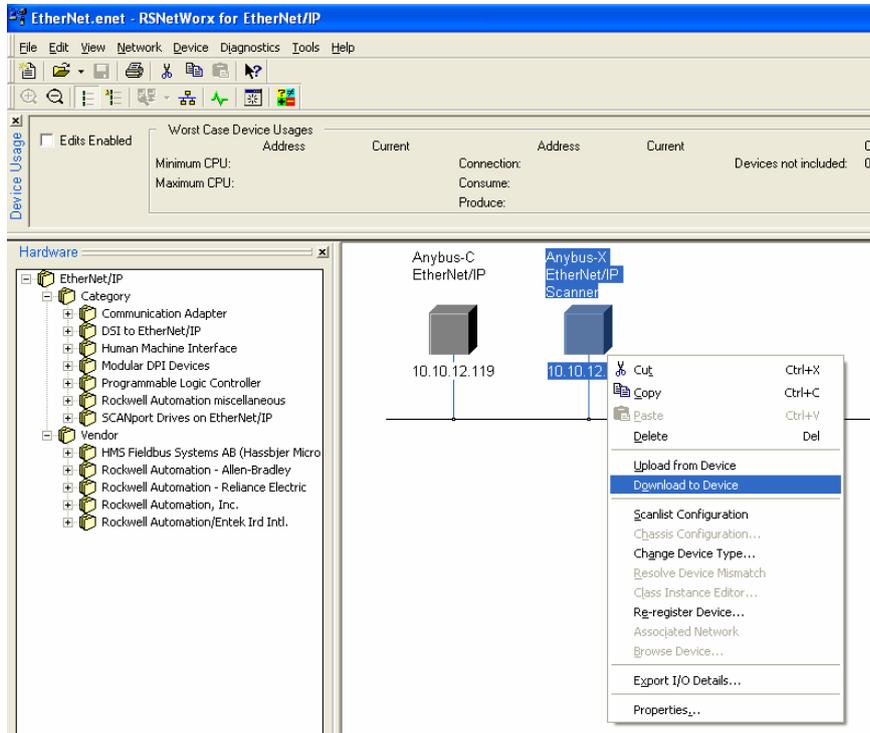

Figure 21 Opening the Scanner configuration menu.

Click on Yes in the next dialogue window to download the Scanlist.

Figure 22 Accepting the download of the Scanlist.

7. Setting the Scanner in run mode

The next step is to set the Scanner in run mode. This will make the network go online and start communicating. To set the Scanner in run mode please see section 1. Setting the Scanner in idle mode.

6. Testing

Now it is possible to access the data exchanged by the Anybus Scanner module and the Adapter modules on the network. Using the PCI-card and the Anybus-M, please see the section 6.2 Monitoring the EtherNet/IP network below. Using the X-gateway please also read the following chapter.

6.1. X-gateway

To be able to monitor the communication between the Scanner and Adapter modules on the EtherNet/IP network using an X-gateway, the other network of the X-gateway has to be online and running. In this test the other network is Modbus-TCP. Thus the Modbus-TCP module of the X-gateway has to be sending/receiving data.

To do this the tool Modscan32 can be used. Using the Modscan32 software, connect to the Modbus-TCP module on the X-gateway and write some values to the holding registers as seen below.
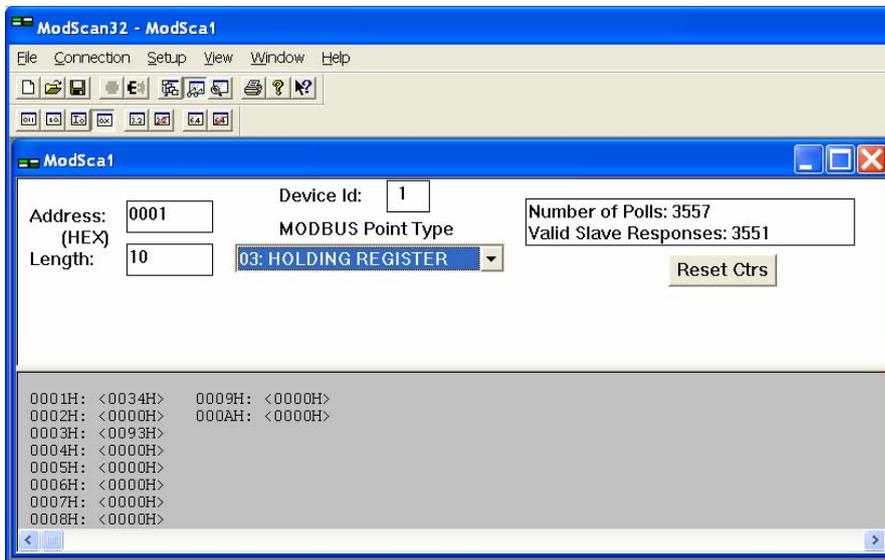

Figure 23 Writing data to the holding register.

6.2. Monitoring the EtherNet/IP network

In this case the Anybus Ethernet/IP Communicator with a loop dongle at the serial port is used as an Adapter test node on the network. A model of the network can be found in Figure 1, Hardware connection overview.

To be able to monitor the communication on the EtherNet/IP network the Wireshark[3] software can be used. Download the software and run the installation file.

To be able to monitor all traffic on the network using the Wireshark, you have to use a hub as it forwards all the traffic on the EtherNet/IP network to all nodes including the PC used for monitoring.
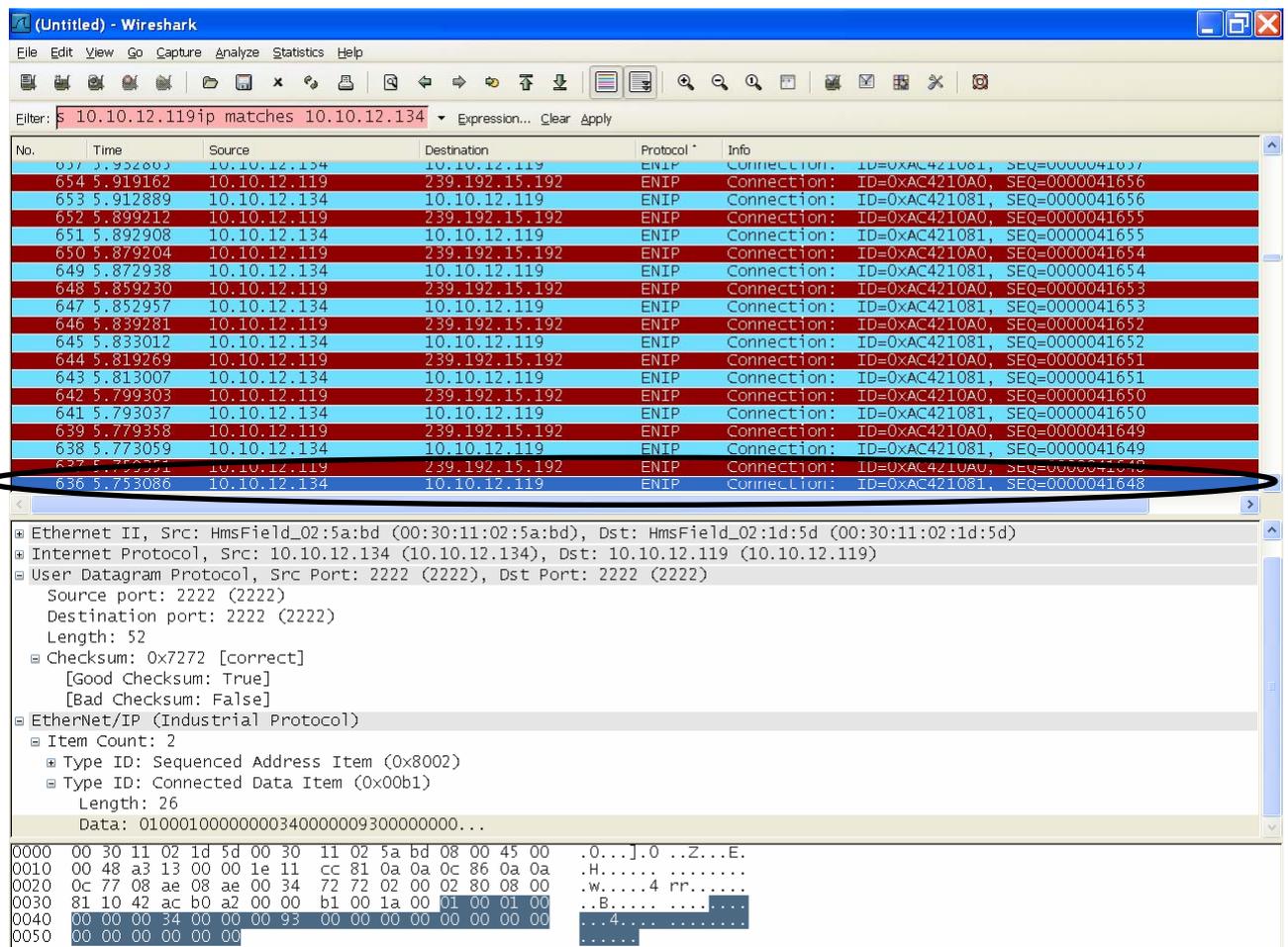

Figure 24 Monitoring the I/O data using Wireshark.

The figure above shows an example of how the monitoring looks. In this case the window indicates I/O data send from the Scanner module to the Adapter module. For more info on how to use the Wireshark please see the Wireshark Users Manual.

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[3] Can be downloaded at http://www.wireshark.org.